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Monetary Policy and Capital Market Performance: An Empirical Evidence from Nigerian Data

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Abstract

This study utilized time series data to determine the effect of monetary policy on the performance of Nigerian capital market. The study was motivated by the inconclusive debate on the real effect of monetary policy on capital market performance. Specifically, this study ascertained the effect of monetary policy rate and cash reserve ratio on the performance of Nigerian capital market surrogated by all share index. Secondary data for the period 1986 to 2016 were collected from the Nigerian Stock Exchange and Central Bank of Nigeria annual reports of various editions. The study applied the Ordinary Least Square (OLS) regression technique and causality analysis in which variations in all share index was regressed on monetary policy rate and cash reserve ratio. The analysis revealed that monetary policy tools have no significant effect on capital market performance. The monetary policy rate has negative significant relationship with capital market performance while cash reserve ratio positively relates with performance of the capital market. Considering the findings emanating from this study, the Central Bank of Nigeria should reduce the current double digit monetary policy to a single digit to attract investments in the capital market. Cash reserve ratio which is currently at 22.5% be lowered to the range: 10%-12% to cause an upsurge in money supply which will in turn improve capital market performance through upward movement in all share index.

Keywords

Monetary policy; Capital market; Causality

Introduction

In recent time, the germane of capital market as a source of long term finance for firms as opposed to bank credit has dominated relevant corporate finance literature. The development of the capital market tremendously influences the level of economic growth and development in a country. Countries with developed capital markets unarguably attract investors, and investments in turn lead to transfer of human and technological know-how required for actualization of grander growth and development in an economy. An economy shifting towards development requires huge resources which banking sector alone or government spending cannot appropriately meet hence, necessitating the need for an ideal capital market. Muktadir-Al-Mukit et al. [1] notes that on one hand, capital market as a component of financial system performs a crucial role for the economic development of a country, while on the other hand, monetary policy is a measure designed to control the supply of money and credits, to adjust interest rate with objective to influence the overall level of economic activity. Through mobilization of resources, the capital market promotes economic growth thus the overall development of the economy is a function of how well the capital market performs and empirical evidences have proved that development of the capital market is a sine qua non for economic growth [2]. The performance of the capital market is supposed to show the state of the country's economy: if stock prices start to fall, economic depression is likely to take place and, conversely, rising stock prices show possible economic growth [3].

The inter-relations between monetary policy actions and interest rate that drives from the typical IS-LM framework that an analysis of stock market activities cannot be completely independent of such policy to the fact that changes in any of the monetary policy instrument such as monetary policy rate, cash reserve ratio and liquidity ratio changes market interest rates instantaneously and forces investors to revalue their equity holdings [4]. In addition, a money supply level that does not serve as an inducement to inflationary predisposition will eliminate frequent fluctuation in values of shares which unilaterally encourages long term investment in the capital market. Welteke et al. [5] opined that capital markets naturally play a part in shaping monetary policy and unambiguously highlighted three facets on why monetary authorities attach great importance to the mechanism of the capital markets. Firstly, capital market provides us early information on leading indicators as to market expectations about macroeconomic developments, for example, changes in the term structure of interest rates relates to future economic growth. Secondly, measuring the expected volatility of future capital market prices shows us the degree of uncertainty attached to expectations. Thirdly, capital market prices give us insights into the expectations of market participants with regard to monetary policy action. It is the aim of this study to ascertain the effect of monetary policy rate and cash reserve ratio on capital market performance in Nigeria.

The remainder of this paper is decomposed as follows: section two takes care of relevant literature reviewed. The method and data was documented in section three. Results of the regression analysis and discussion were detailed in section four while section five concluded the study.

Literature review

Monetary Policy in a lay man's understanding is the management of liquidity by the Central Bank to spur economic growth and development in an economy. Liquidity in the context of monetary policy deals with the level of money in circulation in an economy otherwise referred to as money supply. Monetary policy controls the changes in the volume of money, changes in money growth and interest rates, or conditions on granting financial facilities [6]. The increasing interaction between capital markets and monetary policy is of great concern to investors, financial institutions, and monetary authorities because assessing capital market responses to changes in monetary policy is essential to maximising the returns to portfolio and minimising the exposures to risk [7]. The capital market is a

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financial market where medium and long term debt instrument are traded. Industries have confidence in the capital market to sourcing long term funds at a considerably low rate when compared to the traditional banking system credit. Namini et al. [6] declared that the capital market is an economic symbol that represents the total economic activity of a country thus the various factors affecting the capital market must be identified so that good investments take place in suitable opportunities.

Waud as cited by Durham et al. [8] asserts that based on theoretical foundation, discrete policy rate changes influence forecasts of market determined interest rates and the equity cost of capital, while changes in the discount rate possibly affect expectations of corporate profitability. Theories such as modern portfolio theory by Markowitz, efficient market hypothesis, rational expectation theory and capital assets pricing model have been modelled in literature to discussing monetary policy linkage with capital market performance. Modern portfolio theory by Markowitz argues that risk adverse investors cautiously build basket of investments with high potential earnings while minimizing risks. Investors been risk averse in this context implies that given a choice between two assets with equal rates of return, virtually all investors would prefer the assets with the lowest level of risk. From the perspective of the efficient market hypothesis, stock prices have fully reflected the available information about the value of a firm, investor making additional profit outside what prevails in the market based on these information is impossible. On the premise of the rational expectation theory, firms' satisfactorily rely on past prices to predict likely prices in future which sharpen their future operational pattern. The rational expectation theory uses statistical methods to show that workers and businesses shape the economy by interpreting and updating information about the economy's future hence, government monetary policies can be anticipated, and this expectation may alter the predicted outcome of those policies [9]. With regard to the capital asset pricing model, Ibenta et al. [10] asserts that the capital asset pricing model describes the way prices of individual assets are determined in markets where information is freely available and reflected instantaneously in asset prices, that is in efficient markets. He went further to say that in capital asset pricing model, prices are determined in such a way that risk premiums are proportional to the systematic risk: in an equilibrium market there is no reward for assuming any unsystematic, which can be avoided or easily diversified away.

The study of monetary policy impact on market volatility was conducted by Singh et al. [11] considering 15 years data. Cash reserve ratio and statutory liquidity ratio were the two key liquid rates playing vital role in controlling of liquidity in India. The analysis proved that industrial activity was influenced by changes in cash reserve ratio. Interest rate was found to be non-significant when it comes to be capital market all share indexes. Arch model proved that capital market performance is getting influenced whenever monetary policy is announced. Muktadir-Al-Mukit et al. [1] investigated the effect of monetary policy variables on the performance of stock market in Bangladesh using monthly data over the period of January, 2006 to July, 2012. As a dependent variable, DSE General (DGEN) Index was used as a proxy for stock market performance and four independent variables-money supply, repo rate, inflation rate and three-month Treasury bill rate were used as proxy for monetary variables. Employing co-integration technique, it was observed that in the long run, a one percent increase in inflation, in money supply, in T-bill rate and in repo rate contributes 1.69%, 0.38% and 1.09% increase and 2.37% decrease in market index respectively. The ECM model indicated that 26% of the deviations of stock returns are corrected in the short run. Finally, Granger causality analysis suggested the existence of unidirectional causality from inflation, money supply and T-bill to market index.

Mohamadpour et al. [12] examined the relationship between monetary policy and stock market performance for sample data from first quarter of 1991 to first quarter of 2011 in Malaysia. Co-integration analysis and Vector Error Correction Models (VECM) also suggested a possibility of merely one long-run equilibrium relationship between real Kuala Lumpur Composite Index regards to M1, M2, M3, and real interest rate. The Vector Error Correction Model analysis showed a statistically significant relationship between M1 and M2 as a monetary supply variable included in the model. All in all, the research findings suggested that by increasing the money supply, the market index of Kuala Lumpur Composite Index would grow in long term. Chen et al. [13] ascertained how responsive China's stock market is to the monetary policies. The study utilized event study methodology and studied the response efficiency of Chinese stock market to those monetary policies issued by Central Bank. From the outcomes of the models, they found that there are varying degrees of feedback of Shanghai and Shenzhen stock markets when the policies were enacted, and the impacts of every stimulation starts to fade out in the third trading days after the en-action dates of each monetary policy.

Geraldo et al. [4] evaluated the impact of fiscal and monetary policy actions on the stock market in Ghana. Empirical evidence supported the proposition but its interaction with interest rate suggests that such policies may have concurrent effect on stock market activities. It was found that, both from common correlation analysis to recent econometric modelling indicated that fiscal policy actions have significant effect on stock market activities and not the other way round. In addition, there was a unidirectional causal effect of fiscal policy actions on stock market activity. It was thus concluded that the fiscal policy actions do matter in the activities of stock market activities and, perhaps, becoming more important over time.

Shrestha et al. [14] determined the determinants of the stock market performance in Nepal using monthly data for the period of mid-August 2000 to mid-July 2014. The impact of major changes in politics and Nepal Rastra Bank's policy on lending against share collateral was assessed. Empirical results obtained from OLS estimations of behavioural equations revealed that the performance of stock market was found to respond positively to inflation and broad money growth, and negatively to interest rate. This suggested that, in Nepal, share investors seem to take equity as a hedge against inflation and consider stock as an alternative financial instrument. Furthermore, availability of liquidity and the low interest rate stimulate the performance of the Nepalese stock market. More importantly, stock market was found to respond significantly to changes in political environment and the policy of Nepal Rastra Bank. Hsing et al. [15] assessed the potential impacts of fiscal and monetary policies on stock market performance in Poland. Applying the GARCH model and based on a sample during 1999.Q2 to 2012.Q4, the study depicted that Poland's stock market index is not affected by the ratio of government deficits or debt to GDP and is negatively influenced by the money market rate. The stock index and the ratio of M3 to GDP showed a quadratic relationship with a critical value of 46.03%, suggesting that they have a positive relationship if the M3/GDP ratio is less than 46.03% and a negative relationship if the M3/GDP ratio is greater than 46.03%. Furthermore, Poland's stock index was positively associated with industrial production and stock market performance in Germany and the U.S. and negatively affected by the nominal effective exchange rate and the inflation rate.

Method and Data

We employed the granger causality analysis in ascertaining the effect of monetary policy on capital market performance in Nigeria from 1986 to 2016. Data which were secondary in nature were sourced from Central Bank of Nigeria and Nigerian Stock Exchange. The performance of the Nigerian capital market is dependent variable and was surrogated by All Share Index (ASI). The use of all share index to reflect the performance of the Nigerian capital market is on the notion that the all share index is a numerical index that captures the average adjustment in prices of all securities quoted on the capital market. Two monetary policy instruments of the Central Bank of Nigeria served as the explanatory or independent variables. There were represented and symbolized as MPR for monetary policy rate and CRR for cash reserve ratio.

Model specification

A linear regression model was estimated following a modified model of Onyeke et al. [15]. This resulted in a model where capital market performance was expressed as a function of monetary policy thus:

$$Y_t = C + \sum_{i=1}^{p} A_i + X_{i-1} + \varepsilon_t$$

Where Y_t represents capital market performance in Nigeria as surrogated with all share index, C is model intercept term, A_i is the coefficients of the explanatory variable (s), X_i depicts monetary policy decomposed to accommodate monetary policy rate and cash reserve ratio and ε_t the error term included in a regression equation in line with assumption of classical linear regression model. The disaggregation of monetary policy resulted to:

$$LogASI_t = a_o + a_1 LogMPR_t + a_2 LogCRR_t + \varepsilon_t$$

Analysis, Results and Discussion

Descriptive properties

The descriptive properties of the variables in the model are contained in Table 1. The mean values of ASI, MPR and CRR are 15629.42, 13.61 and 7.63, while 10963.10, 13.50 and 7.50 reflect the median respectively. The maximum values of the variables are 57990.22 for ASI, 26.00 for MPR, 24.00 for CRR. In the same vain, the minimum statistics are 163.80 for ASI, 6.00 for MPR, 1.00 for CRR. The standard deviation was observed to be 14924.78 for ASI, 3.92 for MPR, 5.75 for CRR. All the variables were positively skewed towards normality as evidenced by the positive values of the skewness statistics. The Kurtosis value shows that all the variables are leptokurtic in nature. The Jarque-Bera suggests that MPR and CRR were normally distributed as the p-values are significant at 5% level of significance.

Unit root test

Augmented Dickey-Fuller (ADF) Test and Phillips Perron (PP) was the unit root test adopted to check the stationarity of the variables. The unit root test was performed at first difference and in two sets: intercept and trend intercept. The results of the ADF and PP tests show that all the variables are stationarity at first difference. The unit root tests are detailed in Tables 2 and 3.

Diagnostic test

The model was subjected to diagnostic test of heteroskedasticity, serial correlation, Ramsey specification and multi-collinearity. Tables 4-6 give the details of the sensitivity analysis of the data. The serial correlation LM test in Table 4 shows there is no autocorrelation in the model (p-value > 0.05). As shown in Table 5, there is no heterskedasticity issue in the model (p-value > 0.05). From Table 6, the model was well specified (p-value>0.05) thus the model passed the residual diagnostic test in line with classical assumption of a linear regression model.

OLS regression

Monetary policy and capital market performance: Table 7 depicts that there is a significant negative relationship between monetary policy rate and performance of the capital market but a positive and significant relationship between cash reserve ratio and capital market performance. When monetary policy variables are held constant, performance of the Nigerian capital market would improve by 36, 601.53 points. A unit increase in monetary policy rate results in 2082.76 depreciation in performance of the capital market, while a unit increase in cash reserve ratio leads to 965.64 points rise in capital market performance, The Adjusted R-squared reveals that 35.28% variation in capital market performance was as a result of fluctuations in monetary policy instruments. The significance value (5% significance level) of the F-statistic is an indication that adjustments in monetary policy significantly explained the changes in Nigerian capital market performance within the period studied. The Durbin Watson statistic of 1.05 is not quite close to the benchmark of 2.0 but the serial correlation LM test in Table 6 upheld that the variables were not serially correlated.

Table 1: Descriptive properties.

	ASI	MPR	CRR
Mean	15629.42	13.60871	7.633871
Median	10963.10	13.50000	7.500000
Maximum	57990.22	26.00000	24.00000
Minimum	163.8000	6.000000	1.000000
Std. Dev.	14924.78	3.916879	5.754381
Skewness	0.839628	0.766244	1.209010
Kurtosis	3.143551	4.886243	4.322991
Jarque-Bera	3.668991	7.629142	9.812954
Probability	0.159694	0.022047	0.007399
Sum	484512.0	421.8700	236.6500
Sum Sq. Dev.	6.68E+09	460.2583	993.3869
Observations	31	31	31

Source: Computer analysis using E-views 9.0

Table 2: Result of ADF test.

Variables	Intercept	Trend and Intercept	Remark
ASI	-5.300172 (0.00)*	-5.193517 (0.00)*	Stationary
MPR	-4.199524 (0.00)*	-4.240651 (001)*	Stationary
CRR	-2.276481 (0.03)**	-2.266706 (0.03)**	Stationary

Source: Data output via E-views 9.0

Note: The p-values are in parentheses where (*) and (**) denote significance at 1% and 5% respectively.

Table 3: Result of PP test.

Variables	Intercept	Trend and Intercept	Remark
ASI	-6.381376 (0.00)*	-6.241616 (0.00)*	Stationary
MPR	-7.011884 (0.00)*	-6.882593 (0.00)*	Stationary
CRR	-4.711611 (0.00)*	-4.769737 (0.00)*	Stationary

Source: Data output via E-views 9.0

Note: The p-values are in parentheses where (*) and (**) denote significance at 1% and 5% respectively.

Table 4: Serial correlation LM test.

Obs*R-squared	F-statistic	Prob.
0.495447	2.487634	0.0934

Source: Data output via E-views 9.0

Table 5: Heteroskedasticity test.

Obs*R-squared	F-statistic	Prob.
0.724340	0.835905	0.4474

Source: Data output via E-views 9.0

Table 6: Ramsey reset specification.

F-statistic	df	Prob.
1.739175	(1,20)	0.5356

Source: Data output via E-views 9.0

Table 7: OLS regression: MPR and capital market performance.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	**36601.53**	8201.100	**4.463002**	0.0001
MPR	-2082.757	562.6589	-3.701634	0.0009
CRR	**965.6351**	382.9895	**2.521310**	0.0177
R-squared	**0.395827**	Mean dependent var		**20049.71**
Adjusted R-squared	0.352672	S.D. dependent var		14149.82
S.E. of regression	12007.98	Akaike info criterion		21.52411
Sum squared resid	**4.04E+09**	Schwarz criterion		**21.67136**
Log likelihood	-333.6026	Hannan-Quinn criter.		21.56317
F-statistic	9.172188	Durbin-Watson stat		1.056346
Prob (F-statistic)	**0.000863**			

Source: Data output via E-views 9.0

Granger causality analysis

The effect of monetary policy paraphernalia on capital market performance in Nigeria was ascertained using the granger causality analysis and the output detailed in Table 8. The result depicts that there is no unidirectional or bidirectional relationship between monetary policy instruments: monetary policy rate and cash reserve ratio and capital market performance in Nigeria. This is to say that monetary policy rate and cash reserve ratio have no significant effect on Nigerian capital market performance. However, it is evident that it is the performance of the capital market that detects adjustments in monetary policy rate. This is adjudged by the unidirectional causal relationship between all share index and monetary policy rate as causality flows from all share index to monetary policy rate at 5% level of significance.

Test of hypotheses

Decision criteria: If the p-value of F-statistic in granger causality estimation is less than 0.05, the null hypothesis is rejected. Similarly, if the p-value of granger causality estimation is more than 0.05, the null hypothesis is accepted (Table 9).

Restatement of research hypotheses

H_0: Monetary policy rate has no significant effect on Nigerian capital market performance.

H_0: Cash reserve ratio has no significant effect on share Nigerian capital market performance.

Discussion of Findings

The result of the significant negative relationship between

Table 8: Granger causality analysis.

Null Hypothesis:	Obs	F-Statistic	Prob.	Remarks
MPR does not Granger Cause ASI ASI does not Granger Cause MPR	29	0.02245 6.11192	0.8820 0.0200	No Causality Causality
CRR does not Granger Cause ASI ASI does not Granger Cause CRR	29	0.73154 0.48722	0.3999 0.4911	No Causality No Causality

Source: Data output via E-views 9.0

Table 9: Test of hypotheses.

Hypothesis	Variables	P-Value	F-Statistic	Decision
Hypothesis 1	ASI and MPR	0.8820	0.02245	Accept H_0
Hypothesis 2	ASI and CRR	0.3999	0.73154	Accept H_0

Source: Regression Output from Tables 7 and 8.

monetary policy rate and capital market performance surrogated by all share index points to the unarguable importance of monetary policy rate in influencing economic activities in an economy. The result evidences the unsuitability of the current monetary policy rate of the Central Bank of Nigeria (pegged at 14%) which catapults prime interest rate for credit facility to Rise as high as 25%. With this level of monetary policy rate, investment in the capital will not be very attractive thus frequent valuation of stock values by the few investors which portrays the Nigeria capital market as not depicting the "*green light*" for improved performance and development. This finding supports previous studies of Muktadir-Al-Mukit et al. [1], Mohamadpour et al. [12], Chen et al. [13] and Hsing et al. [15] on the negative correlation between minimum rediscounting rate and performance of capital markets in Nigeria, Bangladesh, Iran, China and Poland. The cash reserve ratio having a positive and significant relationship with capital market performance in Nigeria is equivalent to Chen et al. [13] for China Stock Exchange but in disagreement with the works of Singh et al. [11] for India, Hsing et al. [15] for Polish Stock Exchange. The positive nexus in the case of cash reserve ratio and capital market performance may be hinged to the under-developed nature of the Nigeria capital market amidst few listed securities compared to capital markets in South Africa, China and USA [16].

Conclusion and Recommendations

The role of monetary policy in financial development and enthronement of financial stability is undisputed. Nigerian capital market is still in its developing stage thus requiring carefully and appropriate policy implementation by the Central Bank of Nigeria to enhance its development and competitiveness in the global economy. This study has documented that monetary policy paraphernalia of the monetary authority with respect to adjustments in monetary policy rate is critical for increasing the depth of development in the Nigeria capital market and the financial system in general.

Subsequent to the findings that emanated from this study, the following suggestions are offered for attention of concerned authorities:

The Central Bank of Nigeria should reduce the current double digit monetary policy to a single digit to attract investments in the capital market. High interest rate reduces cash flows of firms' quoted in the stock exchange thus contraction in the values of securities traded on the market.

Cash reserve ratio which is currently at 22.5% should be lowered to a range: 10%-12% to cause an upsurge in money supply which will in turn improve capital market performance through upward movement in all share index.

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